

INFORMATION PROCESSING METHOD, INFORMATION PROCESSING
APPARATUS, INFORMATION PROCESSING SYSTEM, MULTIMEDIA
PRESENTATION SYSTEM, FILE UPDATE METHOD, MULTIMEDIA
PRESENTATION METHOD, AND STORAGE MEDIUM

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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an information
processing apparatus and a file update method which
10 update files in a storage means in which, e.g.,
material files and a scenario file to control the
material files have been stored; an information
processing system and an information processing method
which transfer, e.g., material files and a scenario
15 file through a network or the like and then reproduce
the files at a transfer destination; a presentation
system and a presentation method which perform
presentation by using various materials; and a storage
medium which is to realize each of the above-described
20 methods.

Related Background Art

Recently, a multimedia presentation system which
reproduces multimedia material files such as a still
image, a motion image (or animation), a voice, a
25 character and the like according to a sequence
described in a scenario file for controlling the
multimedia material files in time series has been paid

to attention.

As shown in Fig. 7, the multimedia presentation system includes a PC (personal computer) 111, a multimedia server 113 which is connected to the PC 111 through a network 112, and a monitor 114 and speakers 115 which are connected to the multimedia server 113.

Next, generation use of this system will be explained.

Multimedia materials such as an image, a voice, a character and the like to be subjected to multimedia presentation are collected and filed by the PC 111. The filed multimedia materials are edited by a dedicated authoring tool for the multimedia presentation system. Concretely, the voice, the still image, the motion image and the character are dragged and dropped (i.e., a drag-and-drop operation), and pasted according to a time base. Then a scenario file which is written with a sequence to display the material files is formed on the basis of information obtained by pasting.

After then, the formed scenario file and the material files which together constitute a multimedia program are transferred to the multimedia server 113 through the network 112. The transferred multimedia program is recorded into an HDD (hard disk) 120 of the server 113, and then reproduced in response to an instruction from a not-shown terminal to be provided to

a viewer (or audience).

The above-described multimedia presentation system which performs the presentation by using the multimedia materials also performs a file update according to a
5 following procedure. Fig. 8 is a notional view showing conventional file update processing.

(1) The PC 111 transfers a new multimedia program such as a program 131 shown in Fig. 8 to the HDD 120 of the multimedia server 113.

10 (2) If a directory "PRESEN" of which name is identical with that of the transfer origin does not exist in the HDD 120 of the server 113 in the transfer destination, the directory "PRESEN" is formed at the transfer destination.

15 (3) A scenario file "a.SEN" and multimedia material files "ab.jpg", "a.txt" and "a.snd" which are linked to this scenario and used are recorded into the directory which exists in the HDD 120 of the transfer destination and is identical with that of the transfer
20 origin. At this time, the contents of the HDD 120 of the multimedia server 113 are as shown in the program 131 of Fig. 8.

(4) Next, for example, it is assumed that a presentation scenario in English version is necessary.
25 In this case, a multimedia program 132 of Fig. 8 in which only narration of the previously transferred multimedia program 131 of Fig. 8 has been changed is

additionally transferred to the HDD 120.

(5) Since the directory "PRESEN" now exists in the transfer destination, it is unnecessary to form such the directory.

5 (6) Since a scenario file "b.SEN" does not exist, the scenario file "b.SEN" is recorded in the directory "PRESEN" of the HDD 120.

10 (7) Since the image material file "ab.jpg" now exists, this file is recorded only in a case where a time stamp of the file at the PC 111 side has been updated.

15 (8) Since a voice material file "b.snd" and a character material file "b.txt" have been Anglicized and do not exist in the HDD 120, these files are recorded into the HDD 120. Thus, the directory "PRESEN" in the HDD 120 of the multimedia server 113 is given as a multimedia program 133 shown in Fig. 8.

20 (9) Next, it is assumed that the presentation in English becomes unnecessary, and the scenario file "b.SEN" is deleted. However, since there is a possibility that other material files are referred by another scenario file, it can do nothing but leaves them just as it is. Thus, the directory "PRESEN" in the HDD 120 of the multimedia server 113 is given as a multimedia program 134 shown in Fig. 8. It can be understood that the unnecessary files (i.e., "b.snd" and "b.txt") of which file names start with "b" remain

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in the directory "PRESEN".

In the above-described related background art, there are following problems.

As explained in the above-described procedure (9),
5 in the case where the plural scenario files exist in the identical directory, it is necessary to delete either one of the files. In this case, for example, when the scenario file "b.SEN" in English version is unnecessary, if the material files used in this file
10 are all deleted, the material file "ab.jpg" also used in the scenario file "a.SEN" in Japanese version is deleted. Thus, the inconvenience that the scenario file in Japanese version does not operate is caused.

In order to eliminate such the inconvenience, as
15 shown in the multimedia program 134 of Fig. 8, it is possible to delete only the scenario file "b.SEN" but not to delete any material files. In this case, the problem that, as described above, since unnecessary material files are accumulated in the HDD 120 of the
20 multimedia server 133, a disk capacity is uselessly consumed.

Further, a method using such link count as used in a UNIX filing system can be thought. In this method, how many scenarios the file itself is referred is
25 maintained or held, countdown is performed every time the scenario is deleted, and the file itself is deleted when the count reaches "0". However, since it is

impossible to maintain or hold such a value for the material file such as the ordinary image, voice or the like, this method is inapplicable.

5 In order to eliminate these problems, now the directory of the hard disk is periodically deleted together with the scenario file and the material files.

SUMMARY OF THE INVENTION

10 An object of the present invention is to solve all or at least one of the above-described conventional problems.

15 Another object of the present invention is to provide an information processing apparatus, an information processing system, a presentation system, a file update system, an information processing method, a presentation method and a storage medium which can easily and surely prevent that unnecessary files are accumulated in storage means.

20 Under such the object, according to the preferred embodiment of the present invention, it is disclosed an information processing method which transfers and records material files and scenario files for controlling the material files into storage means and reproduces data of the material files on the basis of
25 the scenario file in the storage means, comprising:

a first step of processing the predetermined scenario file in the storage means to be nonreadable;

and

a second step of processing the unnecessary material files in the storage means such that these files can not be automatically read.

5 Still another object of the present invention is to delete unnecessary sub files (or material files) from those related to a scenario file, the unnecessary sub files being not related to another scenario file.

Under such the object, according to the preferred
10 embodiment of the present invention, it is disclosed the above-described information processing method, wherein the unnecessary material files are the material files which remain after the material files used in the remaining scenario file are excluded from the material
15 files used in the scenario file processed to be nonreadable.

Further, it is preferably disclosed the above-described information processing method, wherein in the scenario file a sequence for controlling each of the
20 material files in time series is described.

Further, it is preferably disclosed the above-described information processing method, wherein the material file is composed of data including image data, voice data or character data.

25 Still another object of the present invention is to delete sub files (or material files) not used in a main file, from those stored in a storage medium.

Under such the object, according to the preferred embodiment of the present invention, it is disclosed an information processing method, comprising:

5 a deletion designation step of designating, in a storage medium which stores a main file executed by an application program and a sub file related to the main file and used when the main file is executed, the file to be deleted, so as to control various file operations; and

10 a deletion step of deleting the file designated in the deletion designation step,

wherein the deletion step includes a control step of performing, when the main file designated in the deletion designation step is deleted, controlling to

15 delete the sub file used by the main file and not used by another main file remaining in the storage medium.

Further, it is preferably disclosed the above-described information processing method, wherein the sub file does not include therein link information to

20 other files, and the main file includes link information of the sub file used when the main file is executed.

Further, it is preferably disclosed the above-described information processing method, wherein the

25 deletion step includes a list formation step of forming a list concerning the sub file used by the main file designated to be deleted and not used by another main

file remaining in the storage medium, in accordance with the deletion designation stored in the deletion designation step.

Still another object of the present invention is to prevent, by deleting a scenario file executed by a presentation program, that unnecessary material files for a scenario file other than the scenario file to be deleted remain.

Under such the object, according to the preferred embodiment of the present invention, it is disclosed the above-described information processing method, wherein the application program is a presentation program, the main file is a scenario file to be executed by the presentation program, and the sub file is a material file related to the scenario file in time series.

Other objects and features of the present invention will become apparent from the following detailed description and the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a conceptional structural view of a multimedia presentation system according to the embodiment of the present invention;

Fig. 2 is a block diagram showing a detailed structure of a multimedia server 13 shown in Fig. 1;

Fig. 3 is a view showing an example of a scenario

file;

Fig. 4 is a flow chart showing a file update procedure in the embodiment;

Fig. 5 is a flow chart showing the file update procedure in the embodiment;

Fig. 6 is a conceptional view showing file update processing in the embodiment;

Fig. 7 is a block diagram showing a schematic structure of a conventional multimedia presentation system; and

Fig. 8 is a conceptional view showing conventional file update processing.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 is a block diagram showing a schematic structure of a multimedia presentation system according to the embodiment of the present invention.

In Fig. 1, numeral 11 denotes a PC (personal computer) for multimedia program authoring. The PC 11 captures multimedia materials such as an image, a voice, a character and the like which together constitute the multimedia program, and files them. Further, the PC 11 has a function to edit these filed materials as a program by using, e.g., an authoring tool. By this editing function, a scenario file which relates a reproduction time to each of image, voice and character files is formed.

The PC 11 is connected to a multimedia server 13 through a network 12 such as an Ethernet or the like. In this connection, the PC 11 has a function to transfer multimedia program data which is composed of the above-described multimedia material files and the scenario file to the side of the multimedia server 13.

The multimedia server 13 includes an HDD (hard disk) 13a which accumulates or stores the program data transferred through the network 12. Also, the multimedia server 13 includes a file update means 13b and a file update control means 13c which features the present invention. The file update means 13b updates the contents of the files in the HDD 13a. When the file update means 13b deletes the predetermined scenario file in the HDD 13a, the file update control means 13c controls the means 13b to automatically delete also unnecessary material files (later explained in detail with reference to Fig. 5). It should be noted that the file update means 13b and the file update control means 13c can be structured not only as software but also as hardware. Also, the multimedia server 13 has a function to interpret the scenario file, and output image data and voice data respectively to a monitor 14 and speakers 15.

Fig. 2 is a block diagram showing a detailed structure of the multimedia server 13 shown in Fig. 1.

As shown in Fig. 2, the multimedia server 13

includes a CPU (central processing unit) 21 which controls a presentation operation entirely. The CPU 21 is connected with the HDD 13a through an HDD I/F (hard disk interface) 22. The multimedia program data transferred through the network 12 is recorded or stored into the HDD 13a through a network I/F (interface) 31.

After then, when the recorded data is reproduced, the CPU 21 interprets the scenario file read from the HDD 13a, and transfers the material files (i.e., image, character and voice data) in the HDD 13a respectively to an image decoder 32, a character generation engine 33 and a voice decoder 34 on the basis of the interpreted result. Thereafter, an analog monitor output is output to the monitor 14 through frame memories 35 and 36, a video effector 38 and a DAC (digital-to-analog converter) 40, while an analog voice output is output to the speakers 15 through the voice decoder 34, a voice DAC 37, a voice effector 39 and a DAC 41.

Next, an operation from collection and editing of materials to reproduction of the collected and edited materials in the multimedia presentation system will be explained.

(A) Collection and Editing of Material

The materials, i.e., an image, a voice, a character and the like, to be subjected to the

multimedia presentation are collected or gathered by the PC 11. First, the still image is captured by a digital camera or a scanner, and edited by photo-retouching software (e.g., "PhotoImpact" manufactured by Ulead Systems, Inc., etc.). Then the edited image data is subjected to JPEG (Joint Photographic Experts Group) compression, and filed.

The motion image is captured by a video capture board ("Power Capture PCI" manufactured by Canopus Corp., etc.), and edited and filed by motion image editing software ("Media Studio" manufactured by Ulead Systems, Inc., etc.). The voice is digitized by a sound board ("Soundblaster" manufactured by Creative Labs, Inc., etc.), and edited and filed by voice editing software ("CoolEdit 96" manufactured by Syntrillium Software Corp., etc.). The character is generated, edited and filed by a general editor.

Thus completed multimedia materials are edited by the authoring tool dedicated to the multimedia presentation system. Concretely, the voice, the still image, the motion image and the character are dragged and dropped (i.e., a drag-and-drop operation), and pasted according to a time base. Then a scenario file which is written with a sequence to reproduce the materials is formed on the basis of information obtained by pasting. An example of such the scenario file is shown in Fig. 3. Here, although a minimum-

structure scenario is used for the explanation, an actual scenario includes hundreds of lines from tens of lines.

5 If the PC 11 can perform reproduction simulation, the PC 11 performs it. Then if a desired multimedia program sequence is achieved, the scenario file and the material files are transferred to the multimedia server 13 through the network 12 (e.g., Ethernet). In order to prevent unnecessary transfer, if a similar program 10 has already existed, a time stamp of each material file is measured such that only the updated file is transferred.

(B) Reproduction by Multimedia Server

15 The transferred multimedia program (i.e., scenario file and material files) is recorded into the HDD 13a of the multimedia server 13, and then reproduced in response to an instruction from a not-shown terminal to be provided to a viewer.

20 Such a reproduction procedure will be explained with reference to the scenario file shown in Fig. 3.

First, if the CPU 21 of the multimedia server 13 receives the reproduction instruction, the CPU 21 reads a scenario file "a.sen" from the HDD 13a and interprets it.

25 Then the CPU 21 interprets an initial line "play a.snd" of this scenario file, reads an "a.snd" file from the HDD 13a, and starts transferring the read file

to the voice decoder 34. Further, the CPU 21 interprets a next line "load ab.jpg", transfers an "ab.jpg" file to the image decoder 32, and compresses/decompresses the file on the frame memory 35 to form the image. At this time, it is assumed that the output from the frame memory 36 is displayed as the monitor output.

Subsequently, the CPU 21 interprets a next line "loadtext a.txt", overwrites the characters on the still image formed on the frame memory 35. Finally, the CPU 21 interprets a next line "dis", and controls the video effector 38. Thus, as the CPU 21 uses a so-called "dissolve effect", it changes the image of the frame memory 36 currently displayed to the image of the frame memory 35 now formed.

In the multimedia presentation system according to the embodiment, the operation from the collection and editing of the material files to the reproduction of them is performed according to the scenario file. The update of the file which features the present invention is performed according to the following procedure as shown in flow charts of Figs. 4 and 5. It is assumed that a program to realize the procedure shown in these flow charts has been stored in, e.g., the HDD 13a of the multimedia server 13.

First, in a step S11, it is judged whether or not the PC 11 transfers a new multimedia program. Namely,

the PC 11 transfers, e.g., a new multimedia program 51 shown in Fig. 6 to the HDD 13a of the multimedia server 13, on the basis of a protocol ftp or the like.

5 In a next step S12, it is judged whether or not a directory "PRESEN" of which name is identical with that of the transfer origin exists in the HDD 13a of the multimedia server 13 in the transfer destination. If judged that the directory "PRESEN" does not exist in the transfer destination, the flow advances to a step 10 S13 to form the directory "PRESEN" of which name is identical with that of the transfer origin.

In a step S14, a scenario file "a.SEN" and multimedia material files "ab.jpg", "a.txt" and "a.snd" which are linked to this scenario and used are recorded 15 into the directory "PRESEN" which exists in the HDD 13a and is identical with that of the transfer origin. At this time, if the file of the identical name already exists in the HDD 13a, the PC 11 measures a time stamp thereof. Then if the measured time stamp is new, the 20 PC 11 overwrites its contents to update this file. Conversely, if the measured time stamp is identical or old, the PC 11 does not do. At this time, the contents of the HDD 13a are as shown in the program 51 of Fig. 6.

25 In a step S15, it is assumed that a presentation scenario in English version is necessary. In this case, a multimedia program 52 of Fig. 6 in which only

narration of the previously transferred multimedia program 51 of Fig. 6 has been changed to English narration is additionally transferred from the PC 11 to the HDD 13a of the multimedia server 13. At this time, since the directory "PRESEN" now exists in the HDD 13a, it is unnecessary to form such the directory.

In a step S16, among the material files which together constitute the additional multimedia program, only the file which does not exist in the directory "PRESEN" and the updated file are recorded into the HDD 13a. Concretely, since a scenario file "b.SEN" does not exist in the directory "PRESEN", this file "b.SEN" is recorded in the directory "PRESEN". Conversely, since an image material file "ab.jpg" already exists in the directory "PRESEN", this file "ab.jpg" is recorded only in a case where a time stamp of this file at the PC 11 side has been updated. Further, since a voice material file "b.snd" and a character material file "b.txt" have been Anglicized and do not exist in the directory "PRESEN", these files are recorded into the HDD 13a. Thus, the directory "PRESEN" in the HDD 13a of the multimedia server 13 is given as a multimedia program 53 shown in Fig. 6.

Following steps S17 to S21 represent the processing which features the embodiment.

For example, since the English presentation becomes unnecessary (step S17 of Fig. 5), in the step

S18 a list bLIST of the materials (including "b.SEN") used in the scenario file "b.SEN" is formed before the scenario file "b.SEN" is deleted. It is represented that $bLIST = \{b.SEN, ab.jpg, b.snd, b.txt\}$.

5 In the next step S19, a list oLIST of the materials used in other all scenario files (only "a.SEN" in the embodiment) at the same directory as that for the scenario file "b.SEN" is formed. It is represented that $oLIST = \{a.SEN, ab.jpg, a.snd, a.txt\}$.

10 In the step S20, a list dLIST of the materials which exist in the list bLIST and do not exist in the list oLIST is formed (program 54 of Fig. 6). It is represented that $dLIST = \{b.SEN, b.snd, b.txt\}$.

15 In the final step S21, the materials of the list dLIST are deleted from the directory "PRESEN" of the HDD 13a. Thus, as shown in a program 55 of Fig. 6, since the unnecessary files each having the file name beginning from "b" are all deleted from the directory "PRESEN", these files do not remain.

20 As described above, according to the embodiment, if it is intended to delete the predetermined scenario file ("b.SEN" in the embodiment) recorded in the directory "PRESEN" of the HDD 13a in the multimedia server 13, the unnecessary material files ("b.snd" and
25 "b.txt" in the embodiment) in the directory "PRESEN" are automatically deleted. Namely, the scenario file to be deleted and the scenario file to be remained are

compared with each other, the material files used in the scenario file to be remained are excluded from the material files used in the scenario file to be deleted, and then the scenario file to be deleted is actually
5 deleted. Thus, it is possible to easily and surely prevent that the unnecessary material files are accumulated in the HDD 13a.

In order to delete the unnecessary material files, the list of the material files used in the scenario
10 file to be deleted and the list of the material files used in the scenario file to be remained in the storage means are compared with each other to detect the unnecessary material files. Therefore, even if the material file itself does not include information
15 representing relation between this material file and the scenario file, it is possible to delete the unnecessary material files.

In the embodiment, the scenario file executed by a presentation program and the file update for the
20 material file used in this scenario file have been explained. Of course, the present invention is not limited to this. For example, it is apparent that the present invention is applicable to a case where a certain main file executed by a certain application
25 program and a sub file related to this main file are deleted. Namely, the present invention can be preferably used in a case where the sub file such as a

mere voice file, a mere JPEG file or the like related to the main file does not include any link information.

It has been explained that the computer program to realize the procedure of the file update method which features the present invention has been stored in the HDD 13a of the multimedia server 13. However, it is possible to store such the computer program into a storage device of the PC 11 such that the PC 11 executes such the operation as forming each list.

Further, in the above-described explanation of the embodiment, the processing in the identical directory has been assumed. However, such the explanation is also applicable to a case where the processing spreads over a directory hierarchy. For example, it is assumed that the scenario file has the material files in its own sub directory. In this case, if the specific scenario file is to be deleted, in the step S19, all the scenario files existing in its own upper directories are searched for until the root directory, and the material files used in these scenario files are all registered into the list oLIST together with a directory path list of full path.

Further, although the Ethernet is used as the network in the embodiment, a WAN (wide area network) such as an ISDN (integrated services digital network) or the like, a cable modem, a satellite line, or the like can be similarly used as the network. Further,

although the hard disk is used as the recording means,
an MO (magneto-optical disk), a CD-RW (compact disk
rewritable), a DVD-RAM (digital versatile disk random
access memory), an FDD (floppy disk drive) or the like
5 can be similarly used as the recording means.

It is needless to say that the present invention
is not limited to the apparatus in the above-described
embodiment but may be applied to a system composed of
plural equipments or an apparatus composed of one
10 equipment. It is also needless to say that the object
of the present invention can be achieved even in a case
where a storage medium storing program codes of a
software for realizing the function of the above-
described embodiment is supplied to a system or an
15 apparatus and then a computer (or CPU or MPU) in the
system or the apparatus reads and executes the program
codes stored in the memory medium.

In this case the program codes themselves read
from the storage medium realize the function of the
20 embodiment, and the storage medium storing such the
program codes constitute the present invention. The
storage medium storing the program codes can be, e.g.,
a floppy disk, a hard disk, an optical disk, a
magneto-optical disk, a CD-ROM, a CD-R, a magnetic tape,
25 a non-volatile memory card, a ROM, or the like.
Further, it is needless to say that the present
invention also includes not only the case where the

function of the embodiment is realized by the execution of the program codes read by the computer, but also a case where an OS or the like running on the computer executes all the processing or a part thereof according to the instructions of the program codes, thereby
5 realizing the function of the embodiment.

Further, it is needless to say that the present invention further includes a case where the program codes read from the storage medium are once stored in a
10 memory provided in a function expansion board inserted in the computer or a function expansion unit connected to the computer, and a CPU or the like provided in the function expansion board or the function expansion unit executes all the processing or a part thereof according to the instructions of such program codes, thereby
15 realizing the functions of the embodiments.

According to the above-described embodiment, it is possible to easily prevent that the unnecessary files are accumulated, and to delete the sub file which is
20 not related to any main file. Therefore, it is possible to prevent that redundant data is accumulated in a storage medium and that a necessary sub file is erroneously deleted.

Further, even if the image file or the voice file
25 used as the sub file itself is not recorded with the information representing the relation to the main file, it is possible to delete the unnecessary sub file.

Further, if the present invention is applied to a presentation program or system which frequently uses the file of JPEG image or voice which itself does not include any information representing the relation to
5 other files, the derived effect is large.

Although the present invention has been explained with the preferred embodiment, the present invention is not limited to the structure of such the embodiment. That is, various modifications and changes are possible
10 in the present invention without departing from the spirit and scope of the attached claims.